REMARKS/ARGUMENTS

The Examiner is thanked for the clarity and conciseness of the Office Action and for the citation of the references which have been studied with interest and care.

Claim Rejections - 35 U.S.C. § 103

Claims 1-8, 10, 12-15, 20, 22-26 and 28-30 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dent et al. (US-6,542,716 hereinafter, Dent) in view of Wiedeman (US-6,587,687).

For the purposes of the present application, Applicants have provided the following definition: "The ultrahigh frequency (UHF) range of the radio spectrum is the band extending from 300 MHz to 3 GHz." [Specification, page 1, lines 24-25.]

Wiedeman does not disclose or suggest a method of determining communication link quality for "UHF communications links" as recited in claim 1. In contrast, as noted in Wiedeman:

> Since the allocation of frequencies for satellite services, a number of proposals have been advanced for the deployment of satellite communications systems. In general, these proposals have involved either a Time Division Multiple Access (TDMA) technique or a Code Division Multiple Access (CDMA) technique.
>
> The communications link availability for these services are a critical factor. In high frequency bands above 3 GHz, and especially above 10 GHz, it is important to avoid a large amount of margin in the signal strength in order to avoid oversizing the satellite design. Further it is important for some systems, such as CDMA systems, to maintain the signal at a fixed level as it arrives at the satellite. ***An important consideration then is the method selected for compensating for rain attenuation in the frequency bands above 3 GHz, and for other types of signal path impairments as well.***

[Wiedeman, column 1, lines 20-36 (emphasis added.)]

Such frequencies are limited by weather conditions in contrast to the low UHF frequencies whose long wavelengths are not affected by rain. The user antennas at lower frequencies, however, are less directive because of the longer wavelength and physical size

restrictions. The less directive antennas increase multipath and interference susceptibility, ionospheric effects result in propagation degradation, and manmade noise reduces system sensitivity.

Wiedeman (column 7) does address foliage absorption, blockage and rain for systems operating above 3 GHz, but the lower UHF frequencies are additionally degraded by ionospheric effects, multipath, manmade noise, and interference that are not factors above 3 GHz. Wiedeman does mention "other propagation effects as well" (column 5, lines 5-16) but does not teach a methodology to separately determine these effects and to distinguish their impact in the aggregate link degradation. Thus, the principal link impairment at the higher frequencies is rain whereas at lower frequencies, a variety of link impairments contribute to the overall reduction of link performance.

Claim 1 and the claims dependent thereupon would not have been obvious to one of ordinary skill in the art over the cited references at least for the reason that Wiedeman does not disclose or suggest "providing the communications device with means for communicating to a user information pertaining to the quality of the UHF communications links and identifying individual component impairments of a total link degradation." Applicants respectfully traverse the Examiner's assertion that Wiedeman "identifies various link impairments..." (column 10, lines 1-14).

Dent teaches a means to determine the location of a mobile user to provide a means to determine the appropriate spot beam for user communication. As described by Dent, the satellite transmits two types of signals, the paging channel that contains the information the user needs for access and communication and the traffic channel providing the user data transfer (see column 4). The paging channels are specific to each of the spot beams allowing the user to distinguish the paging channel having the highest signal level and to establish the access to the traffic channels for data transfer. The traffic channels are separate from the paging channels as taught by Dent.

Applicants' method of determining communication link quality employing beacon signals differs in both intent and implementation from the prior art. The beacon method broadcasts to users anywhere in the field of view available to the satellite rather than the numerous paging for individual spot beams taught by the prior art and serves to identify individual link impairments as well as their aggregate value. Applicants' beacon technique is exclusive of the paging channels and traffic channels as exploited by Dent. The paging channels are modulated with the user access information and the traffic channels likewise are modulated by the user data. Applicants' method does not involve modulation components to

convey user data or user access information. The CW tone (Applicants strenuously traverse any assertion by the Examiner that the Dent paging channel is a CW tone) and the coded beacon signal do not have modulation that is unknown to the user a priori. If the information modulated onto the paging and traffic signals were known a priori, these communication links would serve no purpose. In Applicants' beacon technique, the possible CW tones associated with the satellites within the constellation and the possible codes again associated with the individual satellites are all known a priori within the uncertainty of a Doppler offset. This information is known a priori to the user allowing correlation techniques to be used to receive the coded beacon signal. The correlation output is independent of the system noise, interference, and data traffic. Thus, the user directly measures the beacon signal level from the satellite. Applicants' beacon technique also includes a reference noise source in the form of an ambient termination (630) to allow determination of the noise level. Thus, signal to noise levels can be established -- a feature not contained in the cited prior art. Interference is also indicated by user data channels having an excessive signal level. Per Applicants' beacon technique, scintillation is indicated by fluctuations of the CW tone levels that also provide an independent measurement of the link power. The cross correlation of the coded beacon and the user's code replica provides measurement of multipath levels. Each of these features is not described in the prior art, nor is the signal spectra of Applicants' method. Applicants' beacon technique differs from the prior art in being able to distinguish among the differing link impairments that degrade UHF communications as well as determining their aggregate sum.

For the reasons discussed above, it is respectfully submitted that claims 1-8, 10, 12-15, 20, 22-26 and 28-30 are not disclosed or suggested by the collective teachings of the cited references and would not have been obvious to one of ordinary skill in the art.

Claim 11 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dent in view of Wiedeman as applied to claim 1 above, and further in view of Rydbeck et al. (US-5,930,718 hereinafter, Rydbeck).

For the reasons discussed above, and also considering the teachings of the additional cited reference, it is respectfully submitted that claim 11 is not disclosed or suggested by the collective teachings of the cited references and would not have been obvious to one of ordinary skill in the art.

Claims 16, 18 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dent in view of Wiedeman as applied to claim 15 above, and further in view of Hegendoerfer (US-6,326,922). Claim 17 was rejected under 35 U.S.C. 103(a) as being

unpatentable over Dent in view of Wiedeman and Hegendoerfer as applied to claim 16 above, and further in view of Rudish (US-6,219,006). Claim 27 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dent in view of Wiedeman as applied to claim 20 above, and further in view of Duggan (US-4,776,035).

Some misunderstanding is still apparent in regard to Hegendoerfer, and the problem lies with semantics. Hegendoerfer teaches a folded dipole element for a Yagi antenna design. "Folded" in this sense means the ends of the dipole are connected together, as is commonly done using twin lead for FM radio applications. Such an arrangement reduces the dipole length resulting in a more compact design. This does not mean that the printed circuit board can be physically folded for transport ("articulated").

For the reasons discussed above, and also considering the teachings of the additional cited references, it is respectfully submitted that claims 16-19 and 27 are not disclosed or suggested by the collective teachings of the cited references and would not have been obvious to one of ordinary skill in the art.

Claims 31 and 32 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dent in view of Wiedeman as applied to claim 1 and 20 above, and further in view of the Applicant's admitted prior art, Dybdal et al. (US-5,781,845 hereafter, Dybdal).

Dybdal applies to detecting reflected signal components when the antenna is transmitting. In this case, the design functions like a radar system detecting the time delays of the reflections and minimizing their values with adaptive weighting.

In Applicants' beacon technique, the correlation of the received coded signal is measured for several purposes, and the cross correlation of the received signal and the replica produced by the user displays both the direct signal and the time delayed multipath signal components. These delayed multipath components indicated by the cross correlation provide the tap settings for the adaptive rake receiver used to negate multipath. Conventionally, adaptive rake receivers operate iteratively to establish their values. The insight provided by the time delays measured with the coded beacon signal provide the means to establish the time delay weighting more efficiently. In some cases, FDMA or TDMA, the iterative processing based on signal component correlation does not have the same resolution as is enjoyed by the coded beacon signal that is continuously transmitted over the receiving bandwidth.

For the reasons discussed above, and also considering the teachings of the additional cited references, it is respectfully submitted that claims 31 and 32 are not disclosed or

suggested by the collective teachings of the cited references and would not have been obvious to one of ordinary skill in the art.

Withdrawal of these rejections is respectfully requested.

CONCLUDING REMARKS

Applicants submit that the application is in condition for allowance. Concurrence by the Examiner and early passage of the application to issue are respectfully requested.

Any additional fees which are required in connection with this communication and which are not specifically provided for herewith are authorized to be charged to deposit account no. 500651. Any overpayments are also authorized to be credited to this account.

Respectfully submitted,

July 8, 2006

Peter L. Holmes
Reg. No. 37,353
Attorney for Applicants

HENRICKS, SLAVIN & HOLMES LLP
840 Apollo Street, Suite 200
El Segundo, California 90245-4737
Telephone: (310) 563-1454
Facsimile: (310) 563-1460